

Sand Dune and Shingle Network

Nineteenth Newsletter, June 2014

Linking science and management

Introduction



Paul Rooney
Director – Sand Dune and
Shingle Network

As the nineteenth newsletter of the Sand Dune and Shingle Network goes to press we are supporting the EUCC-France dune conference and workshop in Merlimont, Nord-Pas-de-Calais (see the eighteenth newsletter March 2014). This event is one of two important meetings held this year that are concerned with the future of coastal dune conservation in Europe. The Merlimont meeting will provide a platform for repositioning the Coastal and Marine Union – EUCC, and related to this it is also an opportunity to further develop the European Dune Network. Discussions at Merlimont will be taken forward to the Littoral 2014 conference in Lithuania 22-26 September 2014 (see the back page of this newsletter for details). We urge you to support both events, but if you are not able to attend please let your voice be heard by contacting us direct on dunes@hope.ac.uk regarding the future of the European Dune Network. We will report back on both events in our next newsletter scheduled to be published before the end of 2014.

This newsletter contains the usual range of sand dune articles, but I would like to draw your attention to the report provided by Rennee Johansen on her research in to dune grass fungi. This is a fascinating study that makes for a stimulating read. Renne has also supplied the stunning front cover images for this newsletter. We are very pleased to publish reports on research in progress, and urge PhD students and academics alike to provide us with brief progress reports of their work.

We are hoping to organise some field-based workshops in the next year, and welcome any offers to host an event, or suggestions for themes. The successful model for these events is that they are mainly field based with a priority given to participant discussions and the exchange of knowledge that serves to 'link science and management'. Please get in touch with ideas and offers.

Finally, I would like to thank Tom Marshall for his hard work as a full time graduate intern assisting the network since January 2014. Tom is a valuable addition to our small team, and we hope to see more of him on a part time basis in the future

Network News



Tom Marshall
Network Assistant

Hello and welcome to 19th issue of the Sand Dune and Shingle Network newsletter. Issue 18 was a bumper issue. We all hope you enjoyed it and please let us know what you thought. Spring has sprung and we heading towards the warmer weather of summer. The wild winter shall not be forgotten, we hope to be hearing from you about your shifting shores and dynamic coastlines. Many research grants and projects have been generated by the storma and we will report further on these. Watch this space.

Sea Buckthorn *Hippophae rhamnoides*, and how to manage it is covered in this issue. The Network has quite a lot to do with this problem species. [See our past issues and publications on the subject](#) to learn more. I'm sure you will enjoy all our articles; we have contributions from Ireland, New Zealand/America and the Netherlands amongst others as well as our local Sefton Coast. This is evidence of the hard work by the Sand Dune and Shingle Network to inform and share the work of its members.

Work behind the scenes to improve our website and database is underway so keep an eye on <http://coast.hope.ac.uk/> for changes. Special mention for one of our updates about the Swansea sand dune hydro-ecology meeting 2013. Details may be found at <http://coast.hope.ac.uk/ourprojects/partnersandcollaborations/centreforecologyhydrology/>

This is to be my last issue for the Sand Dune and Shingle Network as a full time member of staff in the role as a graduate intern. I hope you have enjoyed my contribution. I would like to thank Paul and John for all their help and guidance and Liverpool Hope University for the resources and opportunity to work for such an organisation. I hope to make a strong contribution to Newsletter 20.

If you have any ideas and suggestions for the next newsletter, please contact us here at the Sand Dune and Shingle Network at dunes@hope.ac.uk. We are already planning our next issue.

Please visit our new website at <http://coast.hope.ac.uk/> and provide feedback at dunes@hope.ac.uk

Sea Buckthorn *Hippophae rhamnoides* management at North Bull Island, Dublin – an Irish UNESCO Biosphere reserve

Maryann Harris, Senior Executive Parks Superintendent, Dublin City Council

The conservation importance of North Bull Island was identified 100 years ago as one of the 17 'Rothschild Reserves' in Ireland and today it is the site with the most designations within this elite group. It has been a UNESCO Biosphere Reserve since 1981, the only one worldwide entirely situated within a capital city. It is part of the Natura 2000 network as both a Special Protection Area (SPA) and Special Area of Conservation (SAC) for its undisturbed sequence of coastal habitats, including a Priority habitat (fixed grey dunes). The site also includes a RAMSAR wetland. It is a National Nature Reserve and was the first national bird sanctuary in 1931.



North Bull Island is also of national importance for its aesthetic qualities, its amenities - including a Blue Flag beach - and recreational importance in Dublin Bay. It is one of three National Special Amenity Areas in Ireland, designated by the Lord Mayor of Dublin in 1994 and confirmed by Order of the Minister for the Environment in 1995. This followed several years of efforts by the local community, their elected representatives and the Council to make the case and secure the designation. There are several landowners on North Bull Island with the nature reserve under the ownership and management of Dublin City Council Parks Services (DCC).

The dune complex at North Bull Island is relatively young. In 1821, the 1 kilometre-long North Bull Wall was constructed based on the recommendations of the famous Captain Bligh, and gradually sand accumulated behind the wall leading to the formation of North Bull Island. It is now five kilometres in length and one kilometre wide, and covers an area nearly 15 km² in size, including both land and seashore, in North Dublin Bay.

There is evidence in the pollen record that sea buckthorn occurred in eastern Ireland (Co. Down) but died out in the late glacial period, only to be re-introduced in the 19th Century (Hall, 2011). The plant was introduced to North Bull Island in the early-to-mid 20th Century by the two golf clubs situated on the island in an effort to establish a boundary for privacy and for controlling public access from the nature reserve. Its attractiveness and easy establishment made it a favourable good alternative to wire boundary fencing. However, it became a management issue on both private and public lands. In common with

other sites in Europe, the rabbit population on the island declined after the outbreak of myxomatosis. Furthermore, the Irish hare *Lepus timidus hibernicus* population on the island has been declining since the construction of new road to the island in 1964 increased visitor pressure. Grazing by sheep was considered but determined to not be a feasible option due to the urban nature of the site.

Management of the Sea Buckthorn was identified as a main issue in the North Bull Island Management Plan (McCorry and Ryle, 2009) made for the National Special Amenity Area under the Planning Act (2000). Sea Buckthorn has had numerous negative effects on the site over time:

- Nitrogen-fixing by Sea Buckthorn can enrich soil nutrient status. Leaf litter can further alter soil nutrients through decomposition. There was a noticeable change in species composition in the vicinity of the Sea Buckthorn thickets, with increasing occurrence of nitrophilous species such as Nettle *Urtica dioica*.
- The increased density of the vegetation caused shading, further altering species composition, decreasing species diversity and accelerating ecological succession.
- Potential for alteration of groundwater tables, particularly in the vicinity of the alder marsh, the core zone of the UNESCO Biosphere Reserve. A gradual decrease in water levels has been observed in recent years and is recorded as a concern of the site's anagement plan (McCorry and Ryle, 2009).
- The encroachment of the plant into the Annex 1 habitats, including priority grey dunes habitat, through dispersal of seed by birds and also by humans (both directly and indirectly).
- The spiny branches may be hazardous to site visitors unfamiliar with the site.

DCC had been actively removing Sea Buckthorn for several years prior to the 2009 Management plan, which noted cooperation and agreement between DCC and the National Parks and Wildlife Service (NPWS). However, it was observed at that time to be extensive and there had been a recent increase in its encroachment on the alder marsh, with concerns for the groundwater hydrology.

A national policy of eradication of Sea Buckthorn was established in the Republic of Ireland in 2011 when the Birds and Habitats Regulations were made by Ministerial Order. Annex III of the Regulations lists *Hippophae rhamnoides* as a designated non-native invasive species which cannot be sold, transferred or dispersed. In 2011, following the publication of the Regulations, DCC convened a meeting with representatives of the golf clubs to inform them of the upcoming legislative changes and to agree a strategy for a removal programme. Following internal meetings, each club resolved to undertake Sea Buckthorn removal and has been steadily implementing this.

These legislative requirements are strengthened in the Conservation Management Objectives made under the EU Habitats Directive for the North Dublin Bay SAC, as stated by the National Parks and Wildlife Service in 2013. These require that Sea Buckthorn should 'be absent or effectively controlled' for several habitats: Embryonic shifting dunes (2110); Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) (2120); Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130). The target is that 'negative indicator species (including non-natives) are to represent less than 5% cover' (NPWS, 2013).

Due to the sensitive ecology of the site, its urban location and difficulties in accessing some parts of the Island with heavy machinery, management options are constrained. A further constraint on the eradication programme are requirements of the Wildlife Acts (1976-2012) to refrain from any disturbance of vegetation from 1 March to 31 August each year due to nesting songbirds. There has been no provision in the national legislation for a derogation where the vegetation is legally designated as non-native invasive species or which is deemed to be impacting on the vegetation of an SAC habitat. Progress was slow, as DCC had very limited staff resources and the work was labour-intensive.

The current methods used for removal are cutting with a strimmer with a blade attachment and leaving the branches in-situ to avoid spread of any berries. The cover of the decomposing plant limits shoot re-growth while herbicide is taken up by roots. Burning is allowable at this site. In the past two years, we have used a method of injection into the base of the plant with herbicide (glyphosate). We allow it to die off completely to avoid risk of spreading the plant and then take it off site when the plant is no longer viable. Removal of leaf litter is important to avoid nutrient enrichment. These methods have been trialled in cooperation with Fingal County Council at their nearby dunes complexes in north Dublin.

As this site is a UNESCO Biosphere Reserve, we try to encourage active management by the community, including invasive species management. DCC staff had found visitors harvesting berries for food and had concerns that people would plant them within the site or elsewhere without realising the constraints of recent legislation. We then started to plan in 2012-2013 how to use the food value of the berries to encourage a managed harvest and thereby reduce the potential for dispersal by birds through the site. We invited community groups in gardening and environmental networks to assist us to 'eat our way out of the problem' of dispersal and to invite volunteers to help us with the removal in a fun and educational way. The project involved:

- DCC Parks staff gave a talk to volunteers on invasive species, Sea Buckthorn and management objectives for nature conservation.
- A local chef prepared recipes for a variety of foods and drinks using the Sea Buckthorn berries for tasting by volunteers. These included: Sea Buckthorn ice cream, salsa, fizzy drinks etc. The chef also included some of this food on the menu in his restaurant, which increased awareness of the project and encouraged community interest.

- Volunteers were trained and invited to harvest the berries for personal consumption, thereby removing the upper branches.
- Additionally, trained volunteers then removed the older, non-fruiting branches (now easily accessible) and drilled and injected herbicide (glyphosate) into the cambium layer.
- DCC staff recorded and mapped areas of removal and chemical treatment.

This community project started in autumn 2013 and will be repeated in autumn 2014. It was positively received by participants, many of whom returned on more than one weekend to help. It received favourable media coverage by the Irish Times and on national television by RTE Nationwide (broadcast in 3 April 2014). Following this publicity, an additional 300 volunteers have come forward and we envisage this will aid in speeding up the removal programme in 2014 considerably as well as raising awareness of nature conservation. While the project is achieving the aims of eradication, it is also promoting awareness of invasive species generally and of the importance of North Bull Island and its ecology. The project has shown the value of the involvement of the community in addressing management issues and provided training. The organisations which took part included: Bull Island Action Group, Dublin Community Growers, An Taisce's Green Communities, Conservation Volunteers Ireland, the Lifeline Project, students at Dublin Institute of Technology, Eco-UNESCO, students of the Royal College of Surgeons, local Clontarf residents and Chef Liam Moloughney and staff at Moloughney's of Clontarf. There was also a sharing of experience with the biodiversity officer of Fingal County Council, the neighbouring local authority, where Sea Buckthorn has invaded some areas of coastal habitat.

As part of the project, we are recording the overall extent of the Sea Buckthorn cover using GPS and mapping this using QGIS and Geomedia. This work is being done by a graduate intern, and provides training and work experience. We are recording the areas where removal is already in place to track progress. All data is sent to the National Biodiversity Data Centre in Waterford as part of their invasive species monitoring programme and is publicly accessible through their website. We also report these actions under the Eastern River Basin District Plan to achieve compliance with the Water Framework Directive with regard to management of both protected areas and groundwater-dependent species.

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Contributors to this article: Mick Harford and Niamh ni Cholmain (Dublin City Council), Hans Visser (Fingal County Council); thanks to Pat Corrigan, staff at North Bull Island and David Jordan (Dublin City Council), Liam Moloughney and all of the community volunteers on the project.

Photos: Niamh ni Cholmain (Dublin City Council) For more information: <http://www.dublincity.ie/RecreationandCulture/DublinCityParks/VisitaPark/NorthBullIsland/Pages/default.aspx>

Impacts of off-road vehicles on the Sefton Coast sand dunes, Merseyside, UK

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Undulating sand-dunes are an irresistible lure for off-road vehicle drivers, there being an extensive literature on the ecological impacts of these activities worldwide (e.g. Stokowski & LaPointe, 2000). During the 1970s and 1980s, Britain saw an enormous increase in the popularity of off-road driving as a recreational pursuit. This resulted in widespread problems, especially near to urban conurbations. For example, Smith (1981) described off-road vehicle impacts in Merseyside affecting sand dunes, lowland heath, peat land, woodland and man-made habitats, such as disused railway lines. He drew particular attention to effects on the internationally renowned Sefton Coast dune system, which was badly impacted by unauthorized and illegal motor-cycling for a ten-year period between the mid-1970s and the mid-1980s. Eventually, this was brought under control by the combined efforts of site managers, rangers, the local authority and the police. At least one fatality and a serious injury no doubt helped to convince the authorities of the need for effective controls.

Subsequently, incidents were few and far between until the late summer of 2013, when the tracks of large four-wheel drive vehicles began to be seen at several places along the Sefton Coast. Matters culminated in large-scale incursions into the dunes involving several vehicles between January and March 2014, some incidents apparently taking place at night. These caused serious damage to vegetation and soils at Ravenmeols and Birkdale Sandhills Local Nature Reserves, both areas being within the Sefton Coast SSSI and Natura 2000 site. Observed effects included extensive scarring of fixed-dunes, removing vegetation and upper soil horizons, while deep rutting and churning of partially flooded wet-slacks destroyed plantlife, turning soils into liquid mud which was then sprayed onto adjacent vegetation.



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Fig. 1. Site of *Juncus balticus* at Birkdale LNR, January 2014/

The most severe damage was caused to slacks in the Birkdale frontal dunes that have been the subject of long-term floristic studies (Smith, 2006a). In particular, habitat supporting about 70 % of the English population of Baltic Rush *Juncus balticus* was destroyed (Smith, 2006b) (Fig 1), while populations of the Red Data Book "Vulnerable" Flat Sedge *Blysmus compressus* (Smith, 2009) were also severely impacted (Fig. 2), as were other notable plants, such as Marsh Helleborine *Epipactis palustris*, Early Marsh-orchid *Dactylorhiza incarnata* ssp. *coccinea* and Grass-of-Parnassus *Parnassia palustris* (Smith & Deed, 2013). Habitats occupied by the internationally endangered and protected Natterjack Toad *Epidalea calamita* and Sand Lizard *Lacerta agilis* were also affected, though direct impacts were harder to quantify.

In addition to ecological effects, the damage was visually intrusive in what is otherwise an attractive coastal landscape, highly valued as a local amenity.



© P H Smith.

Fig. 2. Site of *Blysmus compressus* at Birkdale LNR, February 2014

Eventually, thanks to the concerted actions of the police assisted by coast rangers, a number of people were "caught in the act", several arrests made and vehicles seized. It is hoped that prosecutions will follow, supported by a detailed report into the events and their effects (Smith, 2014).

Coastal dunes and their specialised flora and fauna are naturally subject to disturbance by the vagaries of wind and tide. They may therefore have some capacity to recover over time from what may appear to be catastrophic damage. For example, some Birkdale slacks were impacted by illegal motor-cycle scrambling in 1984, including the area containing Baltic Rush. Over several years, the rush grew back, presumably from seeds and rhizome fragments in the disturbed soil (Smith, 2006b), though the damage then was relatively superficial compared with that currently observed.

Many dune land plants rely on sandy patches into which, for example, annual species can spread by seed. Similarly, a great many invertebrates and also Sand Lizards need bare sand for basking or egg-laying. Therefore, fixed-dune sites denuded by off-road traffic could indirectly benefit a number of specialist animals and plants, especially as so much of the dune system has become overgrown by rank vegetation in recent years (Smith & Deed, 2014). It is of course preferable that sand-patching is organised as a carefully controlled management operation, rather than produced by unregulated off-road vehicles.

The author would be interested to hear of similar events experienced by Network members.

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Little Tern LIFE+

Susan Rendell-Read

(RSPB) Project Manager EU LIFE+ - Little Tern Recovery Project

Little terns *Sterna albifrons* are the smallest tern breeding on Britain's shores and one of our rarest breeding seabirds. They weigh around 60g and are long-winged, elegant birds. Their black heads are broken by a white forehead which, along with their small size, is the easiest way to identify them. When they return each spring to the UK from the west coast of Africa they start looking for suitable nesting and feeding areas, often returning to traditional sites. They choose gently sloping foreshores of shingle or sand, nesting just above the high water mark.

Little terns struggle to find safe and secure nesting sites and experience a number of obstacles to successful breeding. Their need to nest on open coastal sites brings them into conflict with recreational use of dunes and beaches, where disturbance is a major issue. Nesting on the ground in the open they are also vulnerable to mammalian and avian predators at the egg and chick stages. Little terns also have to adapt to our changing coastline when coastal erosion and coastal squeeze reduces nesting areas, or storm surges change the beach profile.



Photo: © Danny Hercock, Great Yarmouth, Norfolk

Recognising the little tern's plight eleven partners were successful in securing grant funds from the EU to finance a five-year Little Tern Recovery Project covering 23 breeding sites (18 colonies) which hold over two-thirds of the breeding population. The Project is structured into 11 sub-projects within 14 Special Protection Areas of the European Natura 2000 network of protected wildlife sites.

In the past little terns would have nested around the coast singly or in small loose colonies. If one nesting area was lost new ones were created as storms threw up new shingle ridges or flattened coastal vegetation. As coastlines became more developed there were fewer suitable sites being created and existing ones began to be lost through coastal squeeze. Now with recreational pressures and loss

of sites they have concentrated into fewer, larger colonies. As the effects of climate change come into play, issues for little terns will only increase.

Many of the current colonies occur on islands and spits such as at Pagham Harbour on the south coast, the Blackwater Estuary in Essex and Blakeney Point in Norfolk. These sites can be more remote and have less human disturbance but they can also be subject to flooding. Little terns also choose sandy beaches, associated with dune systems, such as Holkham and Winterton in Norfolk and Beadnell Bay in Northumberland – all very popular for dog walking and holidaymakers. If these larger colonies with more pairs and nests suffer poor breeding seasons, due to flooding or persistent disturbance, the affects are greater on the overall breeding population.



Photo ©Kevin Simmonds, Winterton Dunes NNR, Norfolk

The factors affecting little terns are not just about nesting habitat but also about food supply. Little terns feed mainly on small fish which they catch by plunge-diving in shallow waters. They need to be near suitable shallow fishing areas as little terns are most successful when foraging within a few km of their colony. We don't know what the full affects of climate change will be on sea temperatures and currents but it may change spawning and dispersal of prey food, which will impact nesting sites.

The EU LIFE Project needs to address these negatively impacting set of factors of human and predator disturbance, flooding and coastal change. This will not be easy but the Project partners will work across these issues:

- Implementing an advocacy plan to ensure local and national decision making bodies are aware of the plight of little terns on the UK's changing coastline, understand the issues facing breeding success and are briefed about the potential solutions, which can lead to a sustainable breeding population.

- Engaging with local communities so they are informed about their local little tern colonies, they know how to take steps to support protection measures and they are fully involved in helping to run local colony protection schemes.
- By targeting productivity levels of 3 chicks from 4 pairs each year at the Project sites and undertaking full monitoring of each colony; recording particular issues and finding solutions to persistent problems.
- Running a forum so that staff and volunteer wardens working at the colonies can be in regular contact across the UK, sharing ideas and problems. Ideas will be communicated quickly around the network and trial techniques will be peer reviewed by a Technical Group to allow them to be recommended to other sites.
- Studying tern demography by colour-ringing adults and chicks with individual alpha-numeric codes. Ringed birds will be re-sighted using digiscoping methods (a method proven in an Israeli research project) which will improve our knowledge of populations and movement between colony sites during the breeding season.
- Identifying potential new colonies through increased monitoring along the coastline, particularly in Northumberland, Lincolnshire and Suffolk and habitat management for the restoration of former sites such as shingle recharge on small islands and use of estuary dredgings.

Site restoration, which is more likely to be in areas important for wildlife, will need agreement from landowners and land managers and must conform with any protected designations such as SSSI and Natura 2000. Gaining support may not be easy when the argument for little terns locally may be holding in abeyance the natural accretion seawards of part of a dune system or allowing a shingle ridge to roll inland.



Photo South Binness: © Wez Smith, Langstone Harbour – shingle recharge of island

As climate change continues to impact coastal planning and management part of the longer-term answer for little terns may lie with managed realignment schemes (eg Medmerry on the south coast and Donna Nook on the Lincolnshire coast) but we also need to accept in the shorter-term that

managed space needs to be found for little terns at least at some scale within protected habitats.

The project will use the strengths of its partnership of organisations across the UK which brings together experienced staff to provide internal advice to the Project. The Project is 50% EU LIFE + *Nature* funded and 50% from the partners who are; RSPB (co-ordinating partner), Cumbria Wildlife Trust, Denbighshire County Council, Durham County Council, Lincolnshire Wildlife Trust, National Trust, Natural England, Northumberland County Council and Spurn Bird Observatory Trust Ltd., Northumberland Coast AONB and the Industry Nature Conservation Association. The partners will also seek to collaborate regionally with other organisations – widening the impact of the Project - and seek knowledge from European and international experiences.

During the Project the partners will publicise achievements through the national and regional press and will seek to publish two academic papers on the management aspects and the colour-ringing study. There will also be an end-of-project conference to disseminate the knowledge gained, which will include a national and European audience. The overall aim of the Project is to complete the five years with an agreed *long-term* UK little tern recovery plan.



EU LIFE Little Tern Recovery Project - LIFE12 NAT/UK/000869

http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&nproj_id=4755



Photo ©Danny Hercock, Winterton Dunes NNR, Norfolk - close up of chick during ringing (held by volunteer Peter Ansell)

Insects and some other fauna in small scale blow-outs on the Westerberg in the Noordhollands Duinreservaat

Dick Groenendijk & Koosje Lever, dick.groenendijk@pwn.nl

Introduction

The drinking water company PWN manages two nature reserves in the province of Noord-Holland in the Netherlands. These are the Noordhollands Duinreservaat and the Kennemerduinen (which is part of National Park Zuid-Kennemerland), which together have a surface area of more than 7,300 ha. It is an important area in terms of nature and recreation as well as a national protection against flooding. Furthermore, a large part of the drinking water for people of the Province of Noord-Holland is obtained from this nature reserve. One of the main goals of PWN is to aim for more coastal dynamics in the dune area in order to restore natural habitats of the open dunes. Besides large-scale measures, such as the blow-outs in the coastal strip in National Park Zuid-Kennemerland, PWN is also experimenting with small-scale measures. On the Westerberg in the Noordhollands Duinreservaat (near Egmond-Binnen) for instance, volunteers manually removed in late 2012 the vegetation in former small scale blow-outs, aiming to reactivate the process of sand blowing at sites a few kilometres from the coast. It is expected that not only the acidified grasslands will benefit, but also the characteristic fauna of these small scale blow-outs.

Field work

Between May and September 2013 an inventory of insects and other small fauna was conducted in six natural (active) and six reactivated small scale blow-outs on the Westerberg, all situated close together. Field work was carried out during 16 visits. At each visit all 12 blow-outs were visited in random order and all species were counted. If possible, identification was to species level. If this was not possible, the identification was at a higher taxonomic level (mostly family level).

Results

A summary of the results is given in figures 1 and 2. Figure 1 gives some information on the total number of insects and other fauna groups (sorted into eight main groups) in natural and in reactivated small scale blow outs. For all main groups higher densities were present in the newly reactivated small scale blow outs. These differences in density can be explained by the swift development of vegetation in the reactivated small scale blow-outs during the season. Many species and groups seemed to prefer the vegetation to the extreme conditions of the open sand. In particular butterflies, bumblebees and bees seemed to be attracted by the flowers of dewberry *Rubus caesius*.

When looking more specifically to some specialist insects of blow-outs the opposite is true. The beetle *Cicindela hybrida* and all spiderwasps *Pompilidae* were most common in the natural and still active blow outs. In addition, the solitary parasitic bee *Sphecodes albilabris*, species of the wasp family *Sphecidae*, and the family of stiletto flies *Therevidae* were also more frequently found in natural and still active blow-outs, although to a lesser extent (figure 2). Note that

these highly specialist species were also seen in the newly reactivated blow outs after one season, although in lower densities.

Conclusion

Newly reactivated blow outs have good numbers of insects, and in even higher densities compared with natural blow outs. The insects specialized in open sand prefer the natural blow outs although most of these specialist species occur in low densities in the newly reactivated blow outs. We conclude therefore, that reactivating blow outs will stimulate insect biodiversity. Furthermore, if properly managed, the species composition in the reactivated blow-outs will most likely develop to a species composition characteristic for natural blow outs.

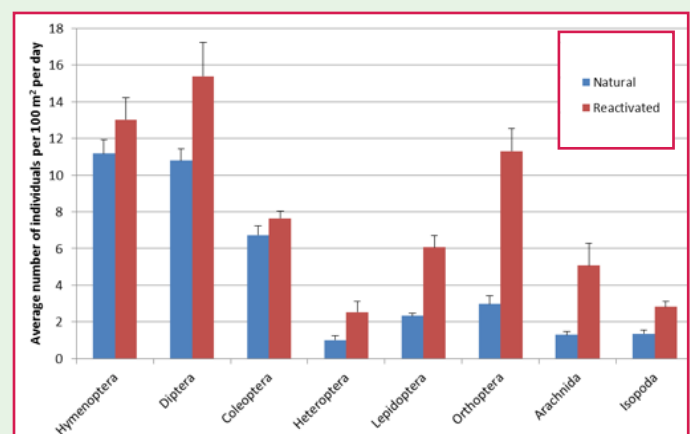


Figure 1: Average number of individuals per 100 m² per inventory day of the eight main groups of natural and reactivated blow outs. Error bars indicate standard errors.

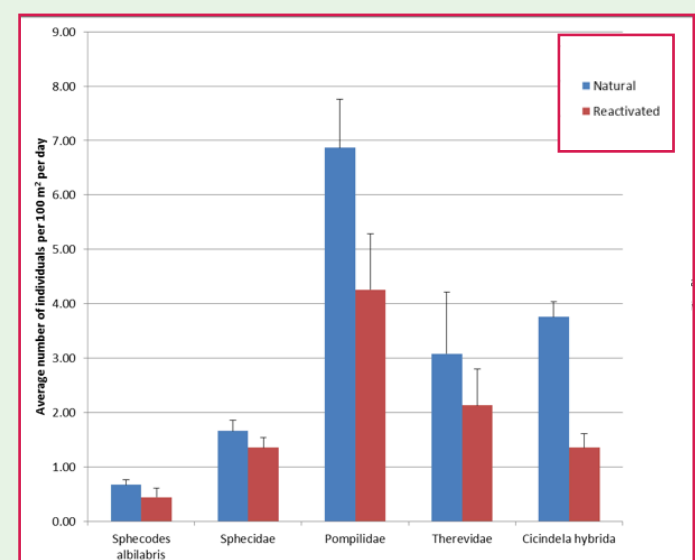


Figure 2: Average number of individuals per 100 m² per inventory day of five species / groups that are characteristic for blow outs. Error bars indicate standard errors.

Tentsmuir National Nature Reserve, Fife, Scotland: winter weather response

Our colleague Tom Cunningham is always busy and no less so following the recent powerful and persistent winter storms. He reports in the most recent newsletter (Tentsmuir's 30th Reserve Newsletter) that erosion has been marked. The fore dunes have changed considerably with over 40m "plucked" away in places. This can be seen by comparing the northward facing image from 2011 with what has been lost since.



©Tom Cunningham, Tentsmuir NNR Manager

This in addition to a record 6ft 2inch loss, allowing Assistant Reserve Manager Alex Easson to walk under the south sea fence "no bother." The sea fence which is used to stock proof the Reserve is left hanging dry.

Tom Cunningham has been at Tentsmuir over 16 years when the first sea fences at the southern and northern boundaries of Tentsmuir Point were constructed. The fences were constructed by salmon netsmen and they still maintain them annually even though they have lost their sea netting licences and have diversified.

Although there is major erosion in the nature reserve the area south of the Reserve continues to build out and is likely to accrete.



© Tom Cunningham, Tentsmuir NNR Manager

With such changes recorded in one winter it will be very interesting to see how the dynamic coast responds, perhaps with massive redistribution of sediment.

The amount of debris has also been notable with, "trees, sea seeds and other vegetation" as well as plastics and litter. Similar accounts of erosion have been recorded and observed on the East coast of Scotland at St Cyrus and Forvie National Nature Reserves.

The updated reserve management plan for 2013-2023 will soon be ready and we look forward to reporting on the main objectives for the management of this classic site. We also congratulate everyone involved at the reserve in celebrating Tentsmuir Point NNR's 60th birthday!

Information about the on-going projects and efforts at Tentsmuir can be found at www.nnr-scotland.org.uk

You want to carry out a research project on Spiekeroog?

We would like to use the opportunity to introduce to you to Wadden Sea Science Center which was established in 2011.

It is situated in the middle of Spiekeroog Island surrounded by unique landscape of dunes, saltmarshes and the Wadden Sea. On offer are well equipped laboratories and lecturer rooms for scientists and students of every age with associated accommodation.

Further details can be found in the on their homepage:

http://www.nationalparkhaus-wittbuelten.de/de/forschung/forschungszentrum_wittbuelten.html

If you have any queries, please do not hesitate to contact during working hours at:

+49-4976-910060 or -69 or by mail:

E-Mail: info@wittbuelten.de

Information appeal on the invasive qualities of Maritime and Macedonian pine on sand dune environments. LinkedIn Group.

We have another request for us to answer a question for a member of our Network. We have been asked to assemble information, resources and advice on the invasive qualities and pros and cons of two pine species on sand dune environments. The pines in question are Macedonian

Pinus peuce and Maritime *Pinus pinaster* pines. If you have any information please join the discussion at:

https://www.linkedin.com/groups/Information-appeal-on-invasive-qualities-7484455?home=&gid=7484455&trk=anet Ug_hm

The Rosebay Willowherb discussion will remain open on LinkedIn. If new information comes to light please provide it for our discussions.

Sea Buckthorn removal in Pembrey Burrows Local Nature Reserve and Pembrey Country Park - the next round

Simeon L. D. Jones

The coastal dunes of Carmarthenshire are still considered to be in unfavourable condition with one of the main reasons being the occurrence of large stands of sea buckthorn. The plant was first introduced around 100 years ago with tree planting in Pembrey Forest when it was then thought that the sand dunes needed stabilising. Since then it has spread widely throughout all the major sand dune systems of Carmarthen Bay.

However, it has since been realised that the incredibly rich dune flora and fauna is threatened as sea buckthorn carpets the dunes. Rare plants including the fen orchid (*Liapris loeselii*) were lost, but also more common plants such as kidney vetch (*Anthyllis vulneraria*) were being affected as they were increasingly confined to the coastal dune habitat. The invertebrate dune fauna was even more threatened as the dunes are a stronghold for many species with Pembrey Burrows LNR ranked 5th in Wales for its invertebrate assemblage.

Hence Sea Buckthorn removal programmes were started and the first Sea Buckthorn removal programme on Pembrey Burrows LNR began in 1996 with further removal in 2006. Thanks to a Resilient Ecosystem Fund grant of £45,000 a further 18 acres (7.3 ha) of older stands of Sea Buckthorn have just been removed in Pembrey Burrows LNR and Pembrey Country Park. A further 30 acres (12 ha) of Sea Buckthorn was felled in the foredunes and it should soon be possible to walk the 1 km distance from Pembrey Burrows LNR through to Pembrey Country Park.

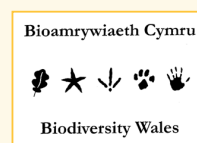
The programme continues in 2014 with further removal of both older stands and treatment of regrowth. A geomorphological study of the Pembrey sand dune system is also being carried out by Natural Resources Wales which will advise on further sand dune rejuvenation work on the peninsula and no doubt even more Sea Buckthorn removal.



It is a continual process of sand dune management to protect some of our rarest species and given the high numbers of pollinating bees, flies and moths that make their home in the hot and dry conditions found in the sand dunes they could be increasingly vital to sustain a functioning ecosystem.

And whilst the work is being undertaken to benefit biodiversity it will also help us to enjoy the special character of the sand dunes by allowing greater access to this wild and windswept landscape.

Carmarthenshire County Council has carried out the work along with support from Natural Resources Wales and a Resilient Ecosystem Fund grant from Welsh Government.



Littoral 2014: Facing Present and Future Coast Challenges, 22-26 September 2014

Littoral 2014 will be hosted by Klaipeda University, Lithuania, and celebrates the 20th anniversary of the EUCC Baltic States Office.

Littoral 2014, following the structure of previous coastal conferences, will address a wide range of coastal research, conservation and management issues and will provide opportunities for networking between coastal researchers and practitioners from all over Europe.

Information on the programme, the sessions and side events is provided at <http://balticlagoons.net/littoral2014/>

There will be a special session on coastal dunes convened by key network members Maike Isermann, Pat Doody and Paul Rooney. There are also two post-conference options to visit the Nemunas Delta, Curonian Lagoon and Curonian Spit.

International survey of dune grass fungi comes to Britain

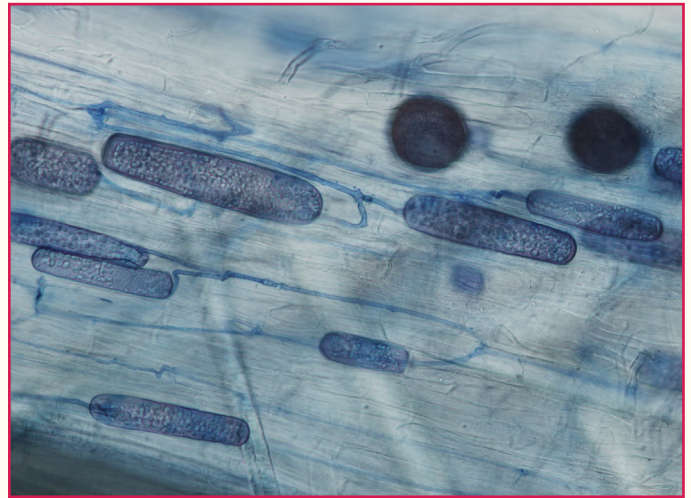
Renee Johansen

Recent advances in technology are generating new research opportunities in microbial ecology and I am taking advantage of these for my PhD project, investigating the fungi in dune grass roots. Fore-dune grasses do an excellent job of holding sand dunes together – but they don't work alone. Their roots are occupied by a whole community of fungi which spread their hyphae (stringy threads which make up the main body of most fungi) through the sand, binding up particles with sticky exudates. Some of these fungi, known as arbuscular mycorrhizal fungi (AMF), also help plants by providing nutrients and protecting them against stresses such as drought and pathogens. In turn, AMF rely on plant roots, which provide them with sugars, for survival. AMF spend their entire lives below ground, growing from soils into roots and back out again, foraging for themselves and their hosts. Dunes have long attracted AMF researchers as it is thought these fungi are likely to be particularly important in environments which are stressful to plants.

AMF can, in fact, be found in most terrestrial plants but despite their importance to plant health, we know little about them. Their lifestyle makes them hard to study. It is possible to view them with microscopes, but this approach cannot separate different species. Technology developed in the last decade, known as 'Next Generation Sequencing,' enables us to assess the microbial community, including AMF, present in samples taken from the environment by reading the DNA present. We can use this DNA to identify microbial organisms, or suggest the presence of unknown species. Currently, science has only described around 300 AMF species but this technology suggests there could be thousands, with some of them native to particular countries. I am using next generation sequencing to reveal the AMF communities in the roots of Marram *Ammophila arenaria*, and grasses which co-occur with it. I will also investigate other fungi such as pathogens, and see whether their distribution patterns are impacted by the occurrence of AMF.

Marram is the main dune binding grass throughout Europe. It has also been moved around the world since the mid nineteenth century for erosion control, with most (possibly all) plants exported for this purpose originally coming from England. Marram isn't great for ecosystems outside its native range – it typically out-competes native plants, provides an inferior habitat for some dune fauna, and even changes dune morphology. It is now a problematic invasive species in many places. However its distribution provides an opportunity to study the composition of AMF communities within the same host plant, in a similar environment, at scales from the local to the global. Marram is known to benefit from AMF, but there is little knowledge of the species that occupy it in Britain and no knowledge of what it associates with outside its native range. There is also no knowledge about whether it houses the same AMF as native plants – there is evidence that different host plant species can house different AMF, and even influence what AMF occupy their neighbours, but we don't know whether this is the case in the fore dune environment.

My PhD, conducted through The University of Auckland, Landcare Research, and Duke University (USA), began with a small pilot study in New Zealand. This revealed a diverse community of around 22 AMF species occupying the roots of the New Zealand native grass *Spinifex sericeus* across a 100 meter dune section in the upper North Island. Some of these look to be new to science. I then sampled Marram and *Spinifex* from two beaches further south, before heading to the USA to work from the mycology laboratory at Duke University in North Carolina, courtesy of a Fulbright scholarship. My US sampling took place in California where I collected roots from Marram



and *Leymus mollis*, a grass native to the USA. Since then, I have been developing new methods to prepare the DNA from my NZ and US samples for next generation sequencing and hope to receive results from this soon.

My work is bringing me to Britain in June 2014. I am planning to sample several west coast dune systems from Braunton Burrows up to the Sefton Coast. I fear winter storm damage may make finding suitable sites challenging but could also provide an opportunity to compare AMF communities in plants newly occupying freshly forming dunes with those in more established systems. I am sure it will be an exciting trip and would like to thank Tom Marshall for the assistance he has already provided in regards to trip planning and logistics. I look forward to working further with him, with Dr. Barbara Tigar of Liverpool Hope University and with Dr. Gareth Griffith of Aberystwyth University, who have also offered generous support to the project. Following my UK trip I will head back to the US before returning to New Zealand in October. I plan to survey in Australia during the summer of 2015 before writing up my findings. It is exciting to be discovering new knowledge about an often overlooked group of organisms. I feel privileged to be engaged in a project which is taking me to some spectacular places while enabling me to meet great people.

Please feel free to contact me on johansenr@landcareresearch.co.nz if you would like to get in touch about my research and activities.

Recent Publications

Fauna

Krivokhatsky, V. A., Shapoval, N. A. and Shapoval, A. P. (2014) Antlions (Neuroptera, Myrmeleontidae) from ornithological traps on the Curonian Spit: A Three species community Containing a New Species. *Zoologicheskyy zhurnal*. 93 (1), 171-178.

Marrone, F., Deledun, A., Cuartolo, T., Arculeo, M. and Lo Brutto, S. (2014) Species identification of the psammophilous tenebrionid beetles *Phaleria acuminata* Kuster, 1852 and *Phaleria bimaculata* (Linnaeus, 1767) from central Mediterranean beaches: geometric morphometrics and molecular insights from species to population level. *Zoomorphology*. 133 (1), 71-82.

Schirmel, J. and Fartmann, T. (2014) Coastal heathland succession influences butterfly community composition and threatens endangered butterfly species. *Journal of Insect Conservation*. 18 (1), 111-120.

Flora

Bermudez, R. and Retuerto, R. (2014) Together but different: Co-occurring dune plant species differ in their water- nitrogen- use strategies. *Oecologia*. 173 (3), 651-663.

Brownstein, G. Lee, W. G., Pritchard, D. W. and Wilson, J. B. (2014) Turf wars: experimental tests for alternative stable states in a two-phase coastal ecosystem. *Ecology*. 95 (2), 411-424.

Crutsinger, G. M., Rodriguez-Cabral, M. A., Roddy, A. B., Peay, K. G., Bastow, J. L., Kidder, A. G., Dawson, T. E., Fine, P. V. A. and Rudgers J. A. (2014) Genetic variation within a dominant shrub structures green and brown community assemblages. *Ecology*. 95(2), 387-398.

Isermann, M. and Rooney, P. (2014) Biological flora of the British Isles: *Eryngium maritimum* L. *Journal of Ecology* DOI: 10.1111/1365-2745.12243

Lonard, R. I., Judd, F. W. and Slater, R. (2014) The Biological flora of coastal dunes and wetlands: *Distichlis littoralis* (Engelm.) H. L. Bell & Columbus. *Journal of Coastal Research*. 30 (1), 199-204.

Munoz-Vallws, S., Gallego-Fernandez, J. B. and Cambrolle, J. (2013) The role of the expansion of native-invasive plant species in coastal dunes: The case of *Retama monosperma* in SW Spain. *Acta Oecologica*. 54 (1), 82-89.

Shearer, B. L. and Crane, C. E. (2014) *Phytophthora cinnamomi* disease expression and habitat suitability of soils on a topographic gradient across a coastal plain from dunes to forested peneplain. *Australasian Plant Pathology*. 43 (2), 131-142.

Management

Anfuso, G., Williams, A. T., Cabrera Hernandez, J. A. and Pranzini, E. (2013) Coastal scenic assessment and tourism management in western Cuba: *Tourism Management*. 24(1), 307-320

Modelling

Feagin, R. A., Williams, A. M., Popescu, S., Stuke, J. and Washington R. A. (2014) The Use of Terrestrial Laser Scanning (TLS) in Dune Ecosystems: the lessons learned. *Journal of Coastal Research*. 30 (10), p111-119

Morphology, Sedimentology & Pedology

Ferrari, M., Cabella, R., Berriolo, G. and Montefalcone, M. (2014) Gravel Sediment Bypass between Contiguous Littoral Cells in the NW Mediterranean Sea. *Journal of Coastal Research*. 20 (1), 183-191.

Joep, K. G. S., Poortinga, A., Riksen, M. J. P. M. and Maroulis, J. (2014) Spatio-temporal variability in accretion and erosion of coastal foredunes in the Netherlands: *Regional climate and local topography*. PLoS ONE 9(3): e91115. doi:10.1371/journal.pone.0091115

Clemmensen, L. B., Bendixen, M., Hede, M. U., Nielsen, L. and Murray, A. S. (2014) Morphological records of storm floods exemplified by the impact of the 1872 Baltic storm on a sandy spit system in south-eastern Denmark: *Earth Surface Processes and Landforms*. 39(4), 499 -508

Ott, T. and van Arde, R. J. (2014) Coastal dune topography as a determinant of abiotic conditions and biological community restoration in northern KwaZulu-Natal, South Africa. *Landscape and Ecological Engineering*. 10 (1), 17-28.

Research in progress

The Network welcomes the submission of brief progress reports on research in progress by PhD students and Academics.

Please send articles to dunes@hope.ac.uk

This newsletter has been compiled by Tom Marshall, John Houston and Paul Rooney

Contact dunes@hope.ac.uk

Website <http://coast.hope.ac.uk/>

Cover Photo: The blue structures are fungal. Spores are for reproduction/dispersal and vesicles are structures fungi make to store food in. Microscopic photos ©Renee Johansen

The Sand Dune and Shingle Network is based in the Department of Geography and Environmental Science at Liverpool Hope University

